

76. French, 'Teaching Aristotle'.
 77. See Arnau de Vilanova, *Repetitio super Vita brevis*, Bayerische Staatsbibliothek Ms. Clm 14245, fol. 31r (ed. Michael R. McVaugh). Quoted by Paniagua, Gil-Sotres et al., *Arnaldi de Villanova Opera Medica Omnia*. Vol. VI.2, p. 244.

Medicine
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 state building

CHAPTER TEN

Epidemics and State Medicine in
Fifteenth-Century Milan

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Giovanni Catelano died in 1497, five hundred years ago. In medical circles he was known well only in Milan, but there he was prominent enough that advisers could beg Duke Ludovico Sforza to pay a visit to him before he died.¹ Through his involvement in civic projects advanced by Ludovico's father, the great Renaissance warlord Francesco Sforza, Catelano allied his training in medicine with the interests of early modern state building. The civic death registers of Milan are the primary witness to Catelano's dedication, and to the evidence of an important way that recurrent plague epidemics effected profound medical changes in urban Europe. Although Catelano died just before the French disease offered further challenges to a stable Galenic view of disease, the evidence of this Milanese physician's diagnoses of causes of death illustrates that new diseases were already a troubling feature of the late fifteenth-century medical world. Moreover the casual but necessary process of assigning an official cause to deaths privileged anatomical localization with attention to either the body's surface or to the patient's story.

Giovanni Catelano's name appears in 1452, linked to the first three cases of the earliest surviving register of the Milanese *Necrologi*.² A fierce and costly plague was ending, but the death registers stalwartly recorded details of each new plague death. Catelano reported a newly infected household on Friday, 21 July: an 18-year-old woman named Caterina fell ill on 19 July, and now evidenced a pestiferous 'dragonzello' or bubo in her left groin. At the 'Locus Montanee' (a temporary pest house)³ a 29-year-old woman died of a pestiferous *dragonzello* in the right groin, by Catelano's judgement on 17 July. Finally, this day he also reported that in the convent of St Eufemia, 50-year-old Lucia, wife of lord Alesio Aliprandi, died from 'anthrax' in the left hip, of the pestiferous kind, according to Catelano's judgement on 13 July.

These earliest records do not always clarify the various dates involved, that is, the point at which Catelano actually made his inspection of the ill person, or the cadaver – nor if, in fact, he personally viewed the body rather than simply talked to one who had seen the deceased.

Instead the entries primarily seek to provide information about the length of time a person was incapacitated by illness, the place of residence (including both household and parish) and the primary cause of death. In this last component Catelano offered extraordinarily detailed observations: a case was not merely plague, but plague because a bubo (and not just any swelling but a 'pestiferous' one) bore witness to the underlying cause. Ambiguous evidence, such as 'anthrax' – probably referring to a blackened or discoloured skin lesion over the hip – is preserved in the report and left as a presumptive plague diagnosis. Catelano here and elsewhere meticulously notes the side of the body on which a lesion was visible. In other words, the information that Catelano provided, in this case to the clerk of the office that kept these registers, well exceeded local statutory requirements for cause-of-death reporting.⁴

detached
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records

Catelano probably arrived in Milan at the time Francesco Sforza seized control, for his name is first recorded in 1450 as a 'foreign' member of the prestigious College of Physicians.⁵ Sforza favoured doctors in his retinue and quite a few were able to join this exclusive Milanese body during the 1450s. By the end of the century, no non-native physicians would be allowed in; by the 1530s even prominent native sons such as Girolamo Cardano would be refused if their social qualifications and connections were questionable.⁶ The college controlled formal access to patients in Milan, thus collected fees and protected their long-standing privileges within the city even as their actual public responsibilities diminished. Catelano's career in 'public' health – his lifelong involvement with the *Sanità* (as the health office came to be called), his services to the existing hospitals, and his practical involvement with the early development and use of the *Ospedale Maggiore* (called the *Ca' granda* or great house) – is in many ways a testimony to his social distance from the native Milanese physicians of the college. When he worked with other physicians in making a diagnosis, it was typically either the surgeon of the *Sanità*, Dionysio di Nursia, or the duke's physicians, who were not usually hired from the local talent.

College
of
Physicians

The college had nevertheless ensured their own relationship to the cause-of-death surveillance with civic statutes requiring that reporting and acting upon the reports of dangerous illnesses not be left to poorly educated healers. Milanese college physicians were university graduates (by this time almost exclusively from Pavia), were further examined and licensed, and then underwent a period of traineeship, with mandatory consultation (thus fee-splitting) with established senior collegians if an illness appeared dangerous. In addition to reporting causes of death, collegians had to be called to the patient's bedside if an unofficial

healer's care exceeded three days. The system had obvious economic advantages, but equally obvious and unpleasant responsibilities in risky plague times. Most members of the college were away from Milan in 1452, while the plague still stalked new households.

In a typical entry of the fifteenth-century *Necrologi*, the sector of the city, identified by closest gate, the deceased's name and age – sometimes reported in days or hours if a newborn – and the parish church, appeared along with a cause of death. Burial of individuals older than two years at death required a written report of a cause of death, in every year, whether or not plague threatened. Occasionally the length of time a person was ill found mention in the reports, either linked to a plague diagnosis (because the illness and death were acute and unexpected), or to a firm refusal of plague suspicion (because the illness had lasted long and was all too expected). With most diagnoses the name of a physician appeared, to claim both credit and responsibility for the judgement.

Between 1452 and 1497, the years Catelano was active in Milan, surviving records attest his responsibility for a quarter to a third of all diagnoses of cause of death in the city (see Table 10.1). Many records are now missing, in part because a fire at the *Sanità* on New Year's Eve, 1502/03, claimed them, but even so Giovanni Catelano reported 12 065 deaths. In only twelve of these reports did he (or the clerk) fail to supply a diagnosis. In 13 per cent of the deaths that he reported, Catelano provided four or more primary or contributing causes of death. His successors – even as late as the nineteenth century – were never so meticulous nor concerned with much more than monitoring feared diseases. Table 10.2 shows the principal diagnoses of cause of death reported by Catelano, excluding the plague years, 1483–85.

Catelano lived an inglorious, work-centred life, often housed in properties controlled by the rich hospital trustees, who in turn worried that they might not be asking enough in return for their largesse.⁷ Every major epidemic to hit Milan during his 45-year career found Catelano on the front lines – one of the few university-trained physicians to undertake the thankless task of surveillance, and survive. One plague year, 1468, he had to defend and justify nearly every decision that he made, because declarations of plague interfered with the elaborate summer marriage plans of Duke Galeazzo Maria Sforza.⁸ In his reports Catelano described many trips, both pre- and post-mortem, to the lodgings of individuals who may have had plague. He looked over the bodies of victims for signs of the feared infection, and he clearly probed surviving family members or other doctors for details of the patient's sufferings. Catelano and other physicians were accused of stealing from plague victims; and his diagnoses and methods were challenged by the new, tyrannical, 22-year-old duke. The death of Catelano's housekeeper

Table 10.1 Catelano and Death reports,* 1452-1494

Year	Total deaths reported	Catelano's reports (%)
[1452] §	831	304 (36.5)
1453	787	252 (32.0)
1459	1 249	451 (36.1)
[1469]	1 626	656 (40.3)
[1470]	1 228	507 (41.3)
1471	1 556	660 (42.4)
1472	1 711	658 (38.5)
1474	1 677	612 (36.5)
1475	1 653	589 (35.6)
[1476]	1 873	696 (37.2)
[1477]	3 775	1 493 (39.5)
1478	2 878	716 (24.9)
1479	2 198	649 (29.5)
1480	1 927	529 (27.5)
[1481]	702	211 (30.1)
1482	2 394	621 (25.9)
1487	1 424	307 (21.6)
1488	1 515	265 (17.5)
1489	2 100	301 (14.3)
1490	1 986	326 (16.4)
1491	2 200	427 (19.4)
1492	2 083	399 (19.1)
1494	2 564	436 (16.6)

Notes:

* There are additionally scattered reports from years with fewer than 500 deaths reported.

§ Brackets [] indicate years for which surviving *Necrologi* are not complete.

from plague made him a plague suspect, so he had to walk the familiar streets with clear and visible indication that he himself was a source of contamination to others.

Three times during Catelano's half century at work in Milan bubonic plague appeared in the city: 1451-52, 1468 and 1483-85. The 1468 plague was quite mild in comparison to the other two plagues. Plague had a minor, cameo role again in 1506-07, and in the war-torn years of the early 1510s. Before 1450 the last great plague was in 1400-02; the next monstrous epidemic after 1485 levelled the city in 1524. Thus Catelano's life in service coincided with two punishing plagues in

Table 10.2 Diagnoses of Giovanni Catelano, non-plague years: percentage of all diagnoses coded (n = 20 917)

Diagnosis	Number	%
Continuous fever	2 640	12.6
Hectic fever	2 170	10.4
Other fevers	3 525	16.9
[Acute fever]	46	0.1
Chronic fever	620	3.0
Pleurisy	442	2.1
Catarrh	526	2.5
Asthma	488	2.3
Phthisis	278	1.3
Pneumonia	178	0.8
Dropsy	450	2.2
Cachetic, emaciated	344	1.6
Old age	475	3.9
Flux, diarrhoea, and dysentery	1 176	5.6
'Worms'	444	2.1
Chronic illness	220	1.1
Measles	486	2.3
Smallpox	95	0.5
Plague	184	0.9
Fistulae	246	1.2
Ulcers	92	0.5
Epilepsy	383	1.8
No diagnosis given	12	0.1

Milan, and he was primarily engaged in public service during both epidemics. His first-hand experience with two great plagues was atypical.

Modern demographic analysis of these later fifteenth-century plagues in Milan focuses on the cycles of war, famine and plague that moderated mortality as well as governmental response to crises.⁹ In some ways little changed during this period because Milan had long before developed a state-of-the-art surveillance and management system in plague control. Compared to her neighbours, even among the advanced northern Italian city states, Milan was typically first in creating government offices dedicated to gathering information about plague occurrences outside and inside its domain, first in designating locations to which plague suspects, plague victims or the homeless were transported during epidemics, first in employing (usually by the Dukes of Milan)

physicians who maintained that plague was a contagious disease best confronted with controls that minimized contact between the ill and the well.¹⁰

The overall effect of sustained governmental control of plague was, by 1450, a focused and dedicated health office derived from the earlier 'officials in charge of bulletins' (*ufficiali delle bollette*). Reports came to both the senate and to the duke.¹¹ Information was gathered at the parish level, and typically monitored both illnesses and deaths; permission to bury a body was linked to reporting. Probably as early as the 1430s, and certainly by the time of Francesco Sforza this system no longer relied exclusively on the parish elders for conveying information.¹² Rather, the College of Physicians asserted the value of its professional stature and expertise, as well as its justly privileged role in monitoring state health. When the physicians of Milan became associated with a humdrum, routine surveillance system that was becoming widespread in northern Italy is unknown – possibly many of the Visconti records now lost held some clues to their assertion of interest and privilege.¹³ Whatever the reason they were incorporated into this sphere of civic activity, physician contributions to the record-keeping added a unique element to the civic death records in Milan. Here physicians reported causes of death for all individuals, not simply for disputed or worrisome cases. The health office consequently had to cope with and make sense of the massive amount of information that a physician-inclusive reporting system produced.

The *Necrologi* begin well after the worst of the current plague had passed. Plague was at a peak from July to September 1451, and the best-laid plans to minimize epidemic losses by shipping first the homeless, then plague victims and their families away from the city to Cusago (they were taken along a great canal to a villa 6 miles west of Milan) had failed.¹⁴ The 'Locus Montane', along the perimeter of the city to the southwest was hastily constructed to house more sufferers; monasteries and little-used hospital properties were conscripted as well. Even so, temporary cabins of wood and straw appeared outside all the gates of the city almost as mushroomed after a rain. Reacting to plague as an environmental problem, health officials focused on creating spaces where its effects could be circumscribed, diligently spending communal funds for transporting victims, burying the dead, and sanitizing abandoned dwellings.¹⁵ Military and political advisors who wrote to the duke similarly tended to emphasize the spatial and familial relationships of putative plague victims.¹⁶

Physicians viewing cases and places one at a time instead focused on the outward manifestations of putrefactive processes within the bodies of victims. For example, there was the case of a 25-year-old retainor of

one of the duke's associates. Two physicians working with the *Sanità* in 1468 reported that the man died of a 'draconello in Inguine dextro' – a bubonic swelling in his right groin – but one due to ulceration of the area after application of constricting medications. The putrid matter reversed, that is it travelled inward rather than brought peccant material to the surface as intended, and this in turn caused a 'proportional tertian fever'. Their diagnostic reasoning excluded the possibility of plague, despite an acute swelling in the groin area.¹⁷

The pathological processes at issue here were central to Hippocratic-Galenic medicine. Leaving aside discussion of the predisposing causes of humoral imbalance, once that balance was disrupted the natural healing process was to expel putrefying humours through a variety of different mechanisms. An aposteme, roughly what we might describe as an abscess, represented localization and consolidation of putrefying humours. Naturally any one of the four humours could putrefy, so not all apostemes were the same. It also made a considerable difference in a patient's prognosis where the aposteme originated.¹⁸ If too close to the heart, as happened with fulminant plague, the vital spirits generated by the heart could be overwhelmed and undermined, resulting in the patient's swift demise. A less precariously positioned focus of putrefaction could channel the aposteme's formation to one of the 'emunctories' or outlets for corrupted humours. (We generally associate clusters of lymph nodes with some of the principal sites of the emunctories, though no such anatomical correlation was made in the fifteenth century.) The axilla drained superfluities of the heart; excess or corrupted humour in the liver exited to the groin; putrefaction of humours in the brain led to an aposteme in the neck or behind the ears.¹⁹

Bubonic plague presented an anomaly to medical authorities. On the one hand it was clearly associated with a continuous fever that could not also be characterized as hectic (involving the solid parts), ephemeral (involving the spirits) or putrid (involving the humours). Pestilential fevers came from breathing corrupted air, which generated excess heat in the heart and surrounding region, suppressing the vital spirit.²⁰ On the other hand, buboes were a dramatic clinical feature in epidemics of plague, and buboes were understood usually with the term 'aposteme'. Unfortunately buboes and pestilential fevers could have different etiologies.

During the late fourteenth and fifteenth centuries, physicians were unwilling to assume that the plague was a 'new' disease, neither seen nor understood by Galen and Avicenna.²¹ First they did not view diseases as entities but as humoral imbalances. Secondly, their predecessors had offered so thorough and overarching a synthesis of human pathophysiology (i.e., the description and explanation of disease) that it was difficult to wrest free and reconfigure discrete clinical phenomena.

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Observations about apostemes and about fevers were based on centuries of logically elegant, clinically sophisticated observations.

Chase examined 25 plague treatises written by the medical faculty at Montpellier, a leading medical centre, between 1348 and the mid-fifteenth century, and found that medical educators increasingly differentiated pestilential fevers from 'apostemic diseases' by seeing some apostemes as caused by specific but invisible poisons.²² The poison could be inspired, just as corrupted air incited pestilential fever, or it could be adsorbed in other ways. In the plague cases, internal apostemes were formed which then sought an exit at the emunctories. They thus hypothesized a material cause to plague swellings that might in turn resemble other non-plague apostemes.

The consequence of this idea was twofold. 'Pestilential fevers' became, in theory distinguishable from glandular plague, permitting individuals who carried a less stigmatized diagnosis an escape from the increasingly severe public health protocols during plagues. Secondly, 'apostemic' diseases included both plague and non-plague categories, so that even the sudden appearance of a bubo did not necessarily mean that the plague poison was at work; appearances on the body's surface could deceive. To distinguish one kind of aposteme from another required either a detailed clinical history or some physical means of differentiating among swellings in the emunctories. The clinical history helped to distinguish the original, inciting events, and thus whether the swelling was an 'accident' (a following, consequential event) from humoral disturbances, or was a primary cause (expanding, redirecting poisonous matter). The poison theory also permitted an explanatory model for 'contagion', or spread of the plague through contact.

Caught in this diagnostic nexus, physicians in Milan during the late fifteenth century honed their clinical and anatomical skills to meet the demands of evolving state medicine. The best and most direct example I have found comes from 1468, when the commissar of the *Sanità*, Hector Marchese, confronted Catelano and other college physicians about their failure to diagnose plague early enough in the course of an illness to make segregation of plague victims and suspects straightforward. Marchese wrote to the duke the answer that he received:

in the beginning they neither know nor could have known from the urines [alone], because they do not visit the sick nor touch them ... ; so they report only such-and-such fever. In time the situation changes and the urines appear subjugated and pestilential, and only then do we learn who has plague; only then can we next determine who visited the sick and who touched whom.²³

The duke and his commissars sought unambiguous evidence, and tended to privilege signs read directly from the body, if necessary,

postmortem. Then, at least, all discussion and doubt about the clinical prognosis was over. When new cases of plague occurred despite effective sanitary management, individuals were seen to 'throw out' or expel the signs of pestilence from their sequestered, hidden sites within their bodies.²⁴ Likewise the health officials expelled the infected from the body of the city. In September the duke's spies tracked down a young boy who roguishly escaped, only to die in the suburbs. The duke ordered the local constable to refuse burial until a team could get out to the place and view the body. 'Then,' the Duke Galeazzo Maria Sforza told Hector Marchese,

we'll know the extent to which it was a suspect death, and whether we have to take further precautions. I tell you that at the Pillastrello, which is along the road and just opposite the church [where the boy was found] someone will be waiting for you to inform you about it all.²⁵

Building a permanent lazaretto – an emunctory to drain the putrefactive plague stricken away from the heart of the city – was the firm intention of Galeazzo Maria and his councillors. The issue was decided by a will and architectural plans, given to the city in the midst of plague.²⁶ After 1468 the next important epidemic in Milan coincided with a famine sweeping over most of northern Italy. Not only was this epidemic not a plague epidemic, evidenced in retrospect by its slow but steadily rising mortality rates, but the deaths did not involve many teenagers and young adults, as was common in Milanese plagues. Giuliana Albinì has elegantly analysed the demographic differences between this epidemic and the plague of 1483–85 that followed.²⁷ As others noted before, the principal symptoms reported make this mortality most likely one of epidemic typhus fever. To show what that meant to a stable health department relying on bodies to betray hidden contagion alongside physicians eager to assist their paying patients from an over-zealous application of draconian plague controls, I offer one long case report filed by college physician Matteo dei Busti:

23 March 1479. Concerning the case and the judgement of Donato di Giochario, on the Saturday just past, in the morning when he wanted to get out of bed, where he had remained since the preceding Friday, he was seized by a fainting spell, with diarrhoeal flux [caused] by corrupt yellow bile. Summoned that morning, I applied some cordials and other stomach remedies and he quieted, such that at the hour of vespers when I visited him again he told me he had rested well even with the shortness of breath he had, and he ordered dinner and syrups for the following day, which was Sunday. Then that morning I visited him and he said he had slept well and slept through the night. The urines were fully laudable although he was assailed by fever, and after a full meal he seemed to rest well. Then he confessed

his sins and in the evening took a bit of *phthisana ordeaca* and having a little coughing when he wanted to sleep, the whole night could not rest. His fever rose sharply during the night such that by morning his urine was turbid and, in the upper part, livid. Seeing this I said that this was a bad sign, showing the mortification of natural heat. And when he wanted to eat he began to vomit, choked by some part, though he did retain a small part, probably even a whole dish. And then in the evening of this same day, Master Absalom and I came again. We saw the urines were of very small quantity, were turbid, and his evacuations were corrupted diarrhoea, whence we began to suspect measles [*morbilis*] or other signs. And so, bringing the candle to the bedside, we saw a great quantity of red measles. Holding his pulse from that hour all the way until he had a remission, we judged him to be almost moribund. And these things all took place from Sunday evening until Monday vespers, whence Master Absalom and I deliberated together about this case and decided that this was a continuous choleric fever with a great quantity of venomous matter generated close to the heart, and with red signs of the type which appeared with that fever of 1477, from which [people] died quickly because the great quantity of [putrefactive] matter and its proximity to the heart accelerated death. Knowing these things I, Matteo, made a denunciation to the lord deputies, and even to Hector [Marchese] lest any evil arise in the city and so that they would send Catelano before [the patient] died. With all our might we [tried to report] to the deputies ... the judgement we had made about the appearance of what we had found in [Donato's] axilla. The servants, his sisters, and his wife, who all knew about this thing, said that he had extra flesh there for more than twenty years, though it was presently enlarged. Not knowing whether or not this was so, I debated to myself whether to believe his wife and sisters that the swelling was long-standing, because that Monday, the day he died, I witnessed his sudden decline, the livid urines, and manifold signs. I asked him if he was in pain anywhere and he answered not once but six times that he didn't hurt anywhere except his head, and that for the entirety of this illness he had had pain in his stomach and chest such that he thought he was suffocating, and that elsewhere he was not suffering. Thus he had no pain in any other place, neither in that apostome nor elsewhere, of recent origin. Because this fever can signify its sudden alteration or steady resolution by such pain, and especially with a choleric apostome, thus it must have been that this swelling not only was not contracted with the malady [i.e., the present illness] but also that if it had been it would have been accompanied by pain. That he was not suffering there nor even felt this matter [in the axilla] and because [the area] was continually intact [*boni intellectus*], thus it seemed to me that this apostome was not resultant from the present illness but was an old lesion, because the overlying skin and its natural color had changed. Thus, by these reasons I say that I was unwilling to doubt Donato's story and even that I had full confidence: neither the apostome nor the pain issues escaped me - By the judgement of Mattheo dei Busti.²⁸

In late fifteenth-century Milan it was commonplace to allow the appearance of a patient's urine to guide the physician's diagnosis, prognosis and therapy. And so in this heatedly argued case, a university-trained physician defended his judgement that he did not suspect his patient suffered from plague or any other dangerous disease until the man's urine became cloudy and discoloured (probably 'livid' meant it was blood-tinged). Observing that, he and a colleague moved closer to the patient for a look at the skin, where the by-products of a putrefactive process would also be registered. At this point they saw the 'measles' or red blotches, not well described in the testimonial. In the process they also saw a worrisome lesion under his arm. They concluded first that they were in no danger, that is, that this was not plague and, second, that they had seen the particular form of measles before - in 1477. Matteo dei Busti and Absalom were resolutely convinced that this was not plague, because in seeing the measles we must conclude that they had removed Donato's garments, making visible the swelling in his left axilla; they probably touched him.

Their eyes and ears meanwhile were being sharpened by the vital need to distinguish plague from non-plague. While they acknowledged that choleric fevers could also produce apostemes, they relied on the family's testimony that the lesion was not recent. When called to account for their faulty diagnosis - the reason this report was written - they further argued that the appearance of the skin overlying the affected axilla, as well as the patient's clear and repeated testimony that he did not feel any pain in this part, showed this was not plague. They argued that he surely would have complained of the swelling had this been a plague bubo. Instead he suffered a splitting headache and continued gastrointestinal distress - nausea, vomiting, diarrhoea. The fever of 1477, the one this 'choleric fever' recalled to the attending physician, had been a killer, for the same basic (humoural) reason that plague killed swiftly: putrefaction close to the heart.

Notified of the case, Giovanni Catelano went to see for himself, taking with him the young surgeon of the *Sanità* with whom he had worked closely for at least eight years.²⁹ They saw instead a restless, disoriented man, fearful and near death, with 'purplish and black measles from toe to top, and with a notable bubonic swelling, discoloured and corrupt, in the left axilla'. (Typically Catelano noted the side on which the swelling occurred; Matteo did not.) They examined the corpse three hours after death finding it 'much worse than before', and decided that this was plague and that the patient lied about being ill before Saturday (3½ days before his death), when he had summoned Matteo.

Time appeared to vindicate their official diagnosis of plague. On 1 April, Donato's 20-year-old son died, ill six or seven days in the

sequestered house, and his body revealed 'five blackened pustules [*antracibus*] over his shoulders and back, with a slight pestiferous rash'.³⁰ Eight days later, a 36-year-old female servant, one of the people testifying earlier to the antiquity of Donato's bubonic swelling, died with a measly rash and a bubo in the groin. Finally, Donato's 85-year-old mother died 19 April, however, of 'senile debility'.

Fever accompanied by a rash, headache and delirium, together with a resemblance to the fever of 1477, all suggest the retrospective diagnosis of typhus fever. The epidemic quickly acquired a vernacular name in Lombardy, 'mal mazzucco', a popular defiance of the authority embedded in physicians' neat, Galenic explanations. While the regions south of Bologna tended to merge all illnesses into a generic diagnosis of 'plague' during these years, in Lombardy, the Veneto, and the Piedmont of northern Italy, the fever of 1477-79 was not plague.³¹ Moreover, many claimed the disease was new, unfamiliar to practitioners. In fact twenty individuals in Milan during the late spring of 1478 - for relatively few records survive to document the severe epidemic of 1477 - died with what the doctor's described as 'puntilli' or lesions resembling pinpricks.³² Girolamo Fracastoro would later characterize these lesions as typical of typhus or 'lenticular' fever - a rash resembling lentils - in his classic work *On Contagion and Contagious Diseases*.³³ In addition to the evidence of chroniclers, there is ample support in the Milanese records for deaths from typhus. We could count hundreds of deaths as related to an epidemic of typhus fever if we included the deaths from non-pustular rashes, headaches and 'alienation' (probably referring to delirium), never mind the fact that the 'choleric' fever was the only symptom most would notice, probably even then as a refinement of the more typical continuous fever. See Table 10.3.

Table 10.3 Selected diagnoses of cause of death reported from August 1477 to December 1478 compared to three non-epidemic periods

Diagnosis	1477-78	1470-72	1480-82	1487-89
Continuous fever	2 567	729	731	579
'Acute' fever	213	21	216	78
'Choleric' fever	85	1	10	8
'Measles' or 'red measles'	707	51	18	9
'Alienation'	61	10	17	3
'Urines' reported	178	1	5	1
'Worms' and 'flux'	451	146	235	139
[Total deaths reported]	10 625	5 954	7 333	6 651

In other words, the narrative description of Donato's last illness by Matteo dei Busti can be neatly and forcefully assimilated to a retrospective diagnosis of epidemic typhus fever, but just as easily the corporeal evidence provided by Catelano could lead us to a retrospective diagnosis of plague. It is not important to resolve the matter. Rather the point is that the problem of plague control for urban health departments on the one hand, and individual physicians diagnosing individual clinical cases on the other, elicited both anatomical-pathological evidence visible pre- and post-mortem, and begged full, storied attention to the different meanings that could be attached to bodily signs. The historical timing of the controversy, defining and understanding a new non-plague epidemic in the 1470s and 1480s, places it contemporary with the proliferation of anatomical studies in northern Italy, and to the curious search for wondrously hidden signs of disease or sanctity in the bodies of recently dead individuals.³⁴

Matteo dei Busti's reflections on a later case, during the waning months of the great plague of 1483-85, show how the traditional medical diagnosis of plague in Milan continued to challenge simple determinations from physical, post-mortem findings. Physical evidence for plague or non-plague affliction was linked to urinalysis. Thus on 2 June 1485, Matteo reported that

Margarita, wife of Francisco da Campo, 30 years old, was being cared for by Master Niccolò da Niguarda, when in the fullness of her infirmity she had a continuous fever that came to the point of alienation [or mental confusion], and her urine was sent to me. It was confused at the base, but tended toward clear, or possibly white and confused, as I judged by the rising of the material to the top. I ordered those coming to me that they should see whether or not *morbilli* (measles) were present. First they said that some had appeared, afterwards that they had not. Instead the disorientation had not ceased, from which I predicted from all that I could gather, that she was suffering from *carabito* or a sudden parafrensy, and would either die or begin to recover on the seventh day. As I understand from her account, two days later, on the seventh day, she died.

(Presumably the next was added to the original report to the scribe:)

In the judgement of Matteo dei Busti the above Margarita might have been cured by her doctors if her illness had been recognized earlier. It was questioned whether their decisions were true or, at least, reasonable. We, however, saw her corpse with a certain swelling in the right groin, which could have resulted from something other than plague, as from a crisis or strong accident of the spirits. In the judgements of Catelano and Dionysio.³⁵

Possibly a rash, certainly mental disorientation and the appearance of a bubo all in a plague year - the right signs for the *Sanità* and yet this case

was not judged to be plague. Moreover, the foundational judgement was made on the basis of a flask of urine and the testimony of servants who had both cared for Margarita and carried her urine to the prestigious physician. Three colleagues (Catelano himself, Matteo dei Busti, and Niccolò da Niguarda) and the health department's surgeon agreed about the cause of death.

Urine flasks were a familiar sight to fifteenth-century patients.³⁶ Basically, whatever issued from the body permitted conclusions about the state of the internal, invisible humours. Most of the body's fluids became critical indicators of the processes under way within, and it was not possible for there to be a serious imbalance of the humours without the urine reflecting the pathology. The flask itself was hefty, usually called a matula or 'jordan', and it held a good quantity of urine in order to give the physician who analysed it ample knowledge of the patient's condition that could not be acquired otherwise. The flask had a bowled, full bottom, a short, narrower neck, that rapidly curved out again to contain the 'circulus' or head of the flask. Sediment collected on the bottom (*fundus*), other substances floated to the top, and colour and overall consistency revealed the humour responsible for a patient's illness.

One also read the flask anatomically, as if the matula were a totem of the patient's body, once it contained her urine. The bottom sediment revealed problems in the lower half of the body including the genitals, the middle region showed the state of vital organs such as the liver and spleen (the *substantia*) or the heart and lungs (*superficies*). The top revealed the head's condition, including both sentiments and sensorium, thus matter rising to the top of Margarita's urine flask mirrored her disordered state of consciousness.³⁷ Turbidity in the urine belied incomplete 'digestion' or 'coction', the process by which digestive tract and liver converted food into healthy, nourishing humours.

For medieval physicians extensively trained in the subtleties of all possible permutations of urinary odours, colours, consistencies and inhering solids, the purpose of diagnosis was to understand the underlying pathological process in individual patients. The subject's age, sex, social station (from which both nutrition and activities could be understood), influenced understanding of urinalysis. So what was causing Margarita's confused urine? In the account, Matteo was obviously looking for 'measles', mental alienation, 'parafrensy', and *carabito* as companion indicators of the character and severity of the underlying humoral imbalance. They were all phenomena produced in the same logical way the urine became an indicator, and they allowed him to anticipate a 'crisis' in her condition, at which point she would either die or begin a fitful recovery. This time for Catelano and Dionysio, the swelling in the right groin was subsequently understood in the same

way, that is, produced in the course of her body's desperate effort to expel the putrefying humour.

The mutability of the urine, while it could be defensibly seen as a sensitive clinical indicator of the patient's course of illness, was effectively undermined as a robust and reliable indicator of plague and, hence, as useful evidence for a cause of death. Moreover, since physicians in Milan were by this time convinced that plague was contagious, urinalysis was not only ambivalent information, it logically should have prompted questions about the dangers presented by urine and other body products. *Is this a hit against the moral medicine?*

Reports about urines disappear from the *Necrologi* in the late 1480s. In fact, in most respects detailed arguments about the patients' last sufferings disappeared in the wake of Milan's next, catastrophic bubonic plague. As the plague crept into Milan, Catelano valiantly applied the standard methods of medical diagnostics, as these cases illustrate:

9 September 1483. A new case. Margarita Pagani, 55 years old, died of a continuous fever with measles. On the fourth day of her illness she had confused urines, and she died on the sixth day, according to Master Baptista Bernadigio. She was seen post-mortem and found with various measles and two plague pustules, one on the right, the other on the left, between the neck and the humerus, in the judgement of Master Dyonisio, confirmed by Catelano. *Plague.*

24 September 1483. A new case. Ambrogio, son of Martino Plenio, 20 years old, died after about 4 days ill. He was found dead, with violet and lead-coloured measles on his sides. In the judgement of Catelano and Dyonisio, however, there is another judgement as [provided] below. Ambrogio, son of Martino Plenio, 20 years old, died from continuous fever with one reddish sign on his tibia, because he got in a fight with someone outside the city and was pressed up against a gate. In the judgement of Master Bertolo Syroni. *Visited by our doctors and found to have plague.*

19 October 1483. Zacharina, daughter of Antonio Nizia, 7 years old. Yesterday at 24 hours when she was eating at a tavern (*locus potus communis*), she unwittingly consumed mercury (*aqua argenta sublimata*) mixed with wine. She immediately became agitated (*cepi anxiani et inquietari*), was nauseated, and had other accidents stemming from the ingestion of mercury and other extrinsic poison. Considered post-mortem, she was found to have signs of poison ingestion, such as a blackening of the tongue and palate, [but] with a notable, partly blackened swelling in the groin that was ascribed to ulcers in the fingers on that side. In the judgement of Master Giovanni Catelano.³⁸

But the magnitude of the plague overwhelmed even Giovanni Catelano. Albini emphasizes three features of the 1483-85 plague. First, it was

proportionately less costly in lives than any of the fourteenth-century epidemics, but even so overall mortality reached the 10 per cent level, and the population to confront it was already thinned by a decade of famines and fevers. Secondly, the patterns of mortality by age and sex were characteristic of Milanese plagues, with 5- to 25-year-olds suffering the highest mortality levels, females dying more than males. Thirdly, the health office dramatically intensified its policing agency and its conflation of control and order with public health maintenance.

These systems of reporting deaths reflected an impressive bureaucratic efficiency for so brutal a plague. Records kept of deaths occurring inside sealed houses were automatically assumed to be plague deaths, but otherwise all were counted by name, age, parish and sector. On most days 100 or more deaths (females again dying more frequently) were added to a few cases judged as non-plague. Similarly a register of deaths and recoveries was made at the temporary pest house outside the Porta Orientale. Finally, the duke received notification of new cases each day, a mix of deaths and illnesses verified.³⁹ Of 51 individuals listed on 8 October 1485, for example, eight were reported by the surgeon Dionysio di Nursia; all of the rest were reported by Catelano.⁴⁰ All the individually noted new cases provided the specific bodily evidence of plague, whether bubo, *glandula*, *dragonzello*, *tumore* or *antracibus*, the site and the side of the body, and the accompaniment of other signs, such as red or black 'measles', pregnancy, or fever. Diagnostic standards did not fall, but neither did the plague relent.

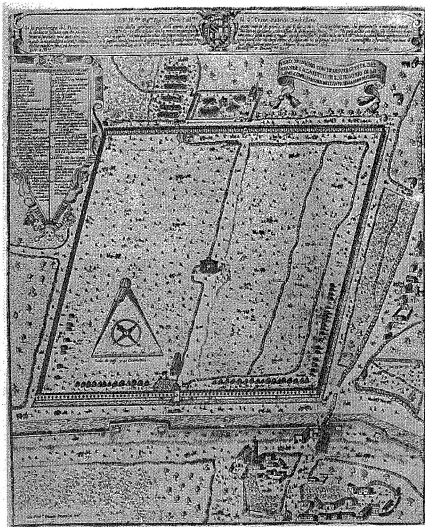
Albini's analysis of this plague reveals that until the full force of the plague arrived in August, 1485, over 60 per cent of the individuals sent to the lazaretto survived. After that point the record-keeping was suspended, and health conditions worsened there. Entire families were relocated, with disproportionately high numbers of women and children confined because the male heads of household had died or fled. Suddenly economically marginal families became targets of mixed public assistance and public control. Up until the murderous phase of plague their chances of survival in the lazaretto were enhanced, for control in the initial fear-driven stages undoubtedly confined many who were not infected. At the same time food and reasonable hygienic amenities protected many of the poor. But in the brutal months of August, September and October minimal assistance slipped toward maximal control. Those confined to their own houses had a better chance of surviving.

Shifting our own gaze from the minutiae of diagnosing apostemes, rashes and urines, to the global costs of a dramatic urban plague is to make the adjustment Catelano made every minute of these months in Milan. Effectively the health office, together with the duke and his

advisers, determined and decided what physicians saw. Controlling the spaces in which plague could be observed enhanced the verification of plague as a contagion. More directly the directors of the *Sanità* applied pressure when necessary to confirm their model of the causes of pestilence. To the duke one wrote 8 December 1485 that the health deputies and members of the duke's Secret Council met in the Castello to discuss what more they needed to do to eradicate plague. Each deputy took a sector of the city, going house to house personally to observe the state of cleaning and purging, and burning objects that had touched plague. They believed that the only reason that plague still existed was that either goods and cloths had not been adequately handled or judgements about causes of death were falsified. A mandatory meeting the next morning of 'those few doctors who can be rounded up' would select two to review all their judgements.⁴¹ With the strength of such corrective lenses Catelano and others doubtless began to see contagion as a diagnostic feature equal to the body's wounds or the patients' stories.

In early 1486 Count Galeotto Bevilacqua died without male heir, so the conditions of his uncle's will in 1468 could finally be applied to the building of a lazaretto (see Figure 10.1). The will imposed two changes on the original plans, which envisioned a vast structure at some distance from the city. The pest house would claim permanently the nearby location at San Gregorio, and the city had to commence building within two years. The architect-engineer's plans were quickly subjected to a group of physicians, who debated the potential this locale had for spreading plague back into the city with the winds or by wicked inmates. Wisely bending to the will of the state, physician advisers concluded that the proposed plans included rooms that retained most of the vapours of plague.⁴² When such did escape through the high windows, they would be rectified by the heat of the sun by day and mist of the stars by night. Moreover, placed northeast of the city, the lazaretto would receive, rather than pass along the putrefactive western winds. They praised the plans for a double water source, carrying polluted water away from the city and its canals. All in all, it was a proper asylum for the poor plague-stricken.

From this point on, I believe, much of the collegiate physicians' tedious advisory work was over. The health office's duties separately matured in a brave new world of focused cause-of-death assessment and focal isolation of plague. The one-time medical contributors to Milanese state medicine retreated to what Guido Panzeri has described as a 'corporate refuge'.⁴³ Elite college physicians, as Catelano had been, gradually withdrew their presence and voice from the routine surveillance of causes of death. A tabulation (Table 10.4) of the diagnoses of Catelano's successor, Antonio di Arona Catelani, points out the general



10.1 The Lazaretto of Milan (1488) in 1630; an immense hollow square of 288 contiguous cells with an octagonal church in the middle. By permission of Civica Raccolta delle Stampe Achille Bertarelli, Castello Sforzesco, Milan.

direction of change. From the surviving register of 1503 until the massive, unfolding plague of 1523–24, Antonio provided 20 917 diagnoses. While there are no dramatic differences in his diagnostic habits during these two decades when compared to Catelano's years, Antonio was almost eight times more likely to report a non-specific 'chronic illness' as

Table 10.4 Causes of death reported by Antonio di Arona Catelani, 1503–1522: percentage of all coded diagnoses (n = 20 917)

Diagnosis	Number	%
Continuous fever	2 981	18.6
Hectic fever	880	5.5
Other fevers	482	2.9
[Acute fever]	46	0.3
Chronic fever	463	2.9
Pleurisy	208	1.2
Catarrh	404	2.5
Asthma	395	2.5
Phthisis	552	3.4
Pneumonia	24	<0.1
Dropsy	522	3.2
Cachetic, emaciated	90	0.6
Old age	301	1.9
Flux, diarrhoea, and dysentery	578	3.7
'Worms'	116	0.7
Chronic illness	1 234	7.7
Measles (red)	239	1.4
Black or purple measles	613	3.8
Smallpox	75	0.5
Plague	796	5.0
Fistulae	205	1.3
Ulcers	89	0.6
Epilepsy	588	3.7
No diagnosis given	12	0.1

the cause of death than was Catelano; Antonio spent less time discerning types of fevers; Antonio never reported the evidence of urinalysis. What the tables by comparison do not reveal is the extent to which the *Sanità* became far less concerned with official, medical diagnosis of accidents, trauma and wounds in general. In the period after 1500, and only then, the nameless certifier 'in the public judgement' (*iudicio publico*) appears in the records whenever street battles led to deaths.

Statutes relevant to the health office were revised in 1534, after the plague of 1523–24, and the pan-Italian famines and fevers of the late 1520s. Collegiate physicians retained their privilege of adjudicating causes of illness and death, but the statutes now allowed an alternative, the 'surgeon of the *Sanità*'. Additional clauses, such as 'no physician

may touch the ill until after the fourth day of the physician's first visit', suggest protective legislation for the physicians, rather than the imposing, restrictive state others have noted about the health office's expanding powers over medical corporations.⁴⁴

Dante Zanetti sampled the annual *Necrologi* data from three centuries: 1503, 1616, and 1783. The first of these years, as we have seen, occurs after the intensive burden of diagnosing cause of death had been transferred from the collegiate doctors to a health department. Over the course of three centuries the basic format of reporting did not change.⁴⁵ Throughout the sixteenth and early seventeenth centuries, the descriptions of various maladies varied considerably from one diagnostician to the next. Individual physicians seemed to have favourite diagnoses. Some of the variation appeared to depend upon the rapport of the physician with the patient or his/her family before death, or upon the dominant medical preference for either Galenic or Hippocratic diagnoses. But overall, the early period had the greatest number of different diagnostic formulations; complexity and variance among diagnoses decreased over time. In 1606-07, two additional years Zanetti studied, there were 34 physicians reporting causes of death, plus one surgeon employed by the *Sanità*: In 1606, 2 886 deaths were reported; 4 020 in 1607. Over 77 per cent of all the reports were made by one poor surgeon, a fellow who of necessity and economic constraints submitted the 'briefest and most schematic of diagnoses'.⁴⁶ He was 48 times more likely to report 'epilepsy' or 'fever and epilepsy', 25 times more likely to cite merely 'long illness'; 51 times more likely than the collegiate physicians to report simply 'newborn'.

Because Zanetti remained convinced that in later years the data more faithfully represented a modern reality of causes of death, he was most impressed that in the later centuries fewer individuals escaped the diagnostic process altogether (18.5 per cent of the entries had no accompanying cause in 1503; fewer than 1 per cent did in 1616; and there was virtually no entry without a cause supplied in 1783). The 'progress' evident in the records was not medical, but bureaucratic - that of the state's enforcement of reporting and, by the eighteenth century, the suppression of the importance of individual diagnosticians. A greater absolute value thus accrued to the diagnoses themselves, which had, in his view, an increasingly more sophisticated, less 'symptomatic' medical formulation wherever they did not report specific diseases. To reinforce this argument, Zanetti noted the steady increase in the diagnostic category 'acute fever', which displaced the complex Galenic classification of fevers.

At the same time the prestige and well-being of collegiate physicians did not suffer from their distancing themselves from public health

opportunities for a steady income.⁴⁷ Instead the increasing interest they assumed in detailed clinical narratives seems to have offered them expert status in advocating the exemptions their privileged patients required.⁴⁸ Increasing state controls over the poor during epidemic times created new needs for patients and physicians within privileged medical settings. This tacit separation of spheres of activity even during dangerous epidemic times gave elite university physicians good reason to expand the role of narrative in medical practice. At the same time the health office could pursue a corporeal model of diagnosis, more evident, less negotiable, and in perfect harmony with their strategies for confining the poor and the ill.

Acknowledgements

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Notes

1. Archivio di Stato di Milan [hereafter ASM], *Miscellanea storica*, 2, letters numbered 594 to 603.
2. ASM, *Fondo Popolazione*, parte antiqua, reg. 73. The general contents of the *Necrologi* are described by Emilio Motta, 'Morti in Milano dal 1452 al 1552', *Archivio storico lombardo* [hereafter ASL] 18 (1891), pp. 241-86. In general see Carlo M. Cipolla, 'I libri dei morti', in *Le fonti della demografia storica in Italia*, vol. 1, pt 2 (Rome, CISR, 1972), p. 851-952; and Dante Zanetti, 'La morte a Milano nel secoli XVI-XVIII: appunti per una ricerca', *Rivista storica italiana* [hereafter RSI] 88 (1976), pp. 803-51.
3. Carlo Decio, *La peste in Milano nell'anno 1451 e il primo lazaretto a Casago* (Milan, Coglietti, 1900), p. 23; Giuliana Albini, *Guerra, fame, peste: crisi di mortalità e sistema sanitario nella Lombardia tardomedievale* (Bologna, Cappelli, 1982), p. 122.
4. A. Bottero, 'I più antichi statuti del collegio dei medici di Milano', ASL, n.s., 8 (1943), pp. 72-112; and A. Francesco La Cava, 'Igiene e sanità negli statuti di Milano del sec. XIV', *Collano di studi di storia della medicina*, diretta da N. Latronico, vol. 3 (Milan, Hoepli, 1946), pp. 21-89.
5. Sforza made appointments to the health office one of the first orders of business. Governing elites in every Lombard city were in charge of an office relaying information. In Milan the office proper in 1451 consisted of a commissar in charge, a 'medico fisico' [already Catelano?], a surgeon, a barber, a notary, and service personnel - two horsemen, three servants, a person to carry the lists, a cart driver and two gravediggers.

- See Albini *Guerra, fame, peste*, pp. 29–30, and p. 90. The earliest documentation I have found regarding Catelano in Milan is printed in Decio, *La peste in Milano*, p. 30n: Catelano attended the secretary of the Duke's Secret Council. On the College of Physicians and Milanese physicians generally see Luigi Belloni, 'La medicina a Milano sino al Seicento', in *Storia di Milano*, vol. 11, pt xii, (Milan, Treccani degli Alfieri 1958), pp. 597–646 for the extensive section on physicians.
6. Cardano, of illegitimate birth, was eventually admitted. On Cardano see Belloni, 'La medicina a Milano', pp. 628–32; on the general point, see Richard Palmer, 'Physicians and the State in post-medieval Italy', in Andrew Russell, ed., *The Town and State Physician in Europe from the Middle Ages to the Enlightenment*, Wolfenbütteler Forschungen, Band 17 (Wolfenbüttel, Herzog August Bibliothek, 1981), pp. 47–62, here, pp. 51–3.
 7. On the Ospedale Maggiore in general see Salvatore Spinelli, *La Ca' Granda* (Milan, 1958); A. Francesco la Cava, 'Le scuole medico-chirurgiche dell'Ospedale Maggiore di Milano', *Ospedale Maggiore*, 44 (1956), 157–74; and G. C. Bascapé, 'L'assistenza e la beneficenza a Milano dall'Alto medio evo alla fine della dinastia Sforzesca', in *Storia di Milano*, vol. 8, pt iv, pp. 391–420.
- Catelano's remuneration and obligations appear in the *Deliberazioni* of the Ospedale Maggiore's archives, especially in registers, 2, 3 and 4 (1456–69). Register 2, f. 47v, 6 March 1458, applauds Catelano's service: 'Attenda etiam eius modestia et patientia, qua visus est'. But by the late 1470s, Catelano was deemed too busy with general civic tasks, and the directors moved to sever his connection to the hospital; see *Deliberazioni*, reg. 6, f. 24v and f. 59r (November 1477).
8. For discussion of the progression and importance of this plague in Milanese history see A. G. Carmichael, 'Contagion Theory and Contagion Practice in Renaissance Milan', *Renaissance Quarterly*, 44 (1991), pp. 213–36, here p. 224.
 9. G. Albini, 'La mortalità in un grande centro urbano nel '400: il caso di Milano', in R. Comba, G. Piccini, and G. Pinto, eds, *Strutture familiari, epidemie, e migrazione nell'Italia medievale* (Naples, Edizioni scientifiche italiane, 1984), pp. 117–34, here summarizing and extending her *Guerra, fame, peste*.
 10. Richard Palmer, 'The Control of Plague in Venice and Northern Italy: 1348–1600', PhD thesis (University of Kent at Canterbury, 1978), pp. 27–45; and Carlo Cipolla, *Public Health and the Medical Profession in the Renaissance* (Cambridge and New York, Cambridge University Press, 1976), pp. 14–18.
 11. Albini, *Guerra, fame, peste*, pp. 81–90.
 12. Antonio Pasi Testa, 'Alle origini dell'Ufficio di Sanità nel Ducato di Milano e Principato di Pavia', *ASL*, 102 (1976), pp. 376–86; and Albini, *Guerra, fame, peste*, p. 89. Surviving legislation refers to the *commissario sul offitio della conservazione della sanitate di Milan e del Ducato*.
 13. Albini, *Guerra, fame, peste*, p. 86, cites 1438 proclamation that all illnesses had to be reported to parish elders if the patient was in the care of a collegiate physician. Moreover, every 'medicus, ciroychus, barberius, herborarius' must send notice in writing of patients in his care. The ordinance was reconfirmed in 1447.
 14. Albini, *Guerra, fame, peste*, pp. 72–5; Decio, *La peste in Milano*. The 'Locus Montane' became the site of the Ospedale Maggiore, begun in 1456 and opened to patients by 1476.
 15. ASM, *Miscellanea storica*, 3, no. 332, 23 October 1451: 'sotteratori et speciatori et nettatori di le case et casse morbose non usino ne preumano uscire fuori et partirsi da li suoy loci ordinati ...'. If they were in public spaces, they had to wear 'el signo ordinato de la croxeta' on both the front and back of their garment, so that the well could recognize them at a distance.
 16. For example, ASM, *Miscellanea storica*, 2, 2 October 1463, from Bellinino at the Castello in Cotignolo to Francesco Sforza. Eight days before in the house of Andrea Porto
- outside the walls, but abutting the castle, two died of *morbo pestifero*, the which was not known until yesterday, when a cousin of this Andrea, in his household, died and the case was thus revealed as pestiferous. I commanded the said Andrea that he and his whole company in the household must clear out of the area.
- The dead woman's kinsmen, however, first begged to let them bury her at the castle, and when Bellinino refused, said they would bury her 'whether or not I permitted, because I was of little threat'. Negotiations with a local priest to find suitable burial space failed, and the confrontation degenerated into a full test of power, Andrea's company winning.
17. ASM, *Carteggio interno*, 1468, dated 5 August: 'Emanuel famulus dni. Uberti de Flisco [decessit], annorum xxv a dronzello in Inguine dextro propter ulceratione propoliti (?) ex indebita applicatione medicinarum constricturarum. Reversa est materia putredi ad Intus. Et sic causata est febris tertiana continua proportionale sine suspensio. Iudicio Magistri Stephani de Trivulzio et Dionysii de Cerutis chirurgi.'
 18. E.g., Bavero Baviera's [d. 1480] recommendations to poor men:
- Ma se pur ad alcuno sopravvenisse la infectione et si ammorbasse o havendo fatto le cose dite o non si debbe considerare dove sia lo apostema se ello appare. Perche molte siate e ammorbato l'huomo et non li appare apostema essendo lo apostema o antrace ovvero bubone ovvero carboncello ovvero ademenul ovvero giandola o codelosa o chiamala come tu voi. Et non se meraviglia alcuno se io non distinguo al presente la cura della giandola dalla cura del carbone o dalla cura dello antrace o altra apostema. Ne delli carboni generati da diversi humori piu adusti e manco adusti fra si. Ni ancora da humore corrosivo o non corrosivo; perche comunamente non sono medicate queste egritudine da persone che sapesse distinguere simile cose. Ma sotto una generalita metoro la cura perche tutti comunicano in questo che sono venenosi et hanno bisogno o di tutte o di parte de le cose che se diranno
- originally published in 1478; reissued, *Trattato mirabile contra peste composto per ... misser Baviera ... Uno consiglio famoso promulgato a Venesie contra la peste* (Bologna, 1523), f. 12v.

19. Bloodletting was deemed the most effective intervention, but the site from which blood was taken depended upon the original anatomical site of the aposteme (whether visible or invisible at the bedside); and it depended upon the length of time the patient had been ill – for example, drawing from the same side as the lesion was more appropriate early in an illness. See Pedro Gil-Sorres, 'Derivation and Revulsion: The Theory and Practice of Medieval Phlebotomy', in L. García-Ballester, R. K. French, J. Arrizabalaga, and A. Cunningham, eds, *Practical Medicine from Salerno to the Black Death* (Cambridge, Cambridge University Press, 1994), pp. 110–55.
20. On the speciation and pathology of fevers, especially from the putrefactive process, see Iain M. Lonie, 'Fever Pathology in the Sixteenth Century: Tradition and Innovation', *Medical History*, suppl. no. 1 (1981), pp. 19–44.
21. On medieval medical diagnosis in general and physicians' reluctance to see plague as a new disease, see Nancy Siraisi, *Medieval and Early Renaissance Medicine* (Chicago, Chicago University Press, 1990), pp. 123–33; and Jon Arrizabalaga, 'Facing the Black Death: perceptions and reactions of university medical practitioners', in García-Ballester et al., *Practical Medicine from Salerno to the Black Death*, pp. 237–88.
22. Melissa P. Chase, 'Fever, Poisons, and Apostemes: Authority and Experience in Montpellier Plague Treatises', in Pamela Long, ed., *Science and Technology in Medieval Society* (New York, Annals of the New York Academy of Sciences, 1985), pp. 153–69.
23. This translation is freer than the version I supplied in my 'Contagion Theory and Contagion Practice', p. 245. The text of the letter, in ASM, *Miscellanea storica*, 2, no. 70, 5 June 1468, is provided there. Giovanni Simonetta, much closer to the duke than Hector Marchese, repeated the explanation 23 June 1468; now in the ASM, *Sforzesco, Carteggio interno*, no. 844.
24. E.g., ASM, *Miscellanea storica*, 1, no. 229, 22 May 1468 'hebbemo noticia de una Jacomina nominata nel iudicio qua incluso quale in moret butoe il signo pestifero ...', emphasis added.
25. ASM, *Carteggio interno*, 885, 2 September 1468.
26. Luca Beltrami, 'Il lazaretto di Milano', *ASL*, 8 (1882), pp. 403–41; and Pietro Canetta, *Il lazaretto di Milano* (Milan, 1881). The specific idea was presented in a 10 August 1468 letter to the duke. Notary Lazzaro Cairati offered his idea and design for an enormous structure (26 hectares) to be built in Cresenzago, like Cusago at some distance from the city. Cairati and his engineer partner, Elia Reina, envisioned a structure rivaling the Duomo, the Castello and the Ospedale Maggiore. While these plans never materialized, and are now lost, in October 1468 the property that would become the lazaretto site was left to the city in the will of Count Onofrio Bevilacqua, should his sole heir die without male issue. Bevilacqua's heir died childless in 1488.
27. Albini, 'La mortalità in un grande centro urbano nel '400', in R. Comba, G. Piccini and G. Pinto, eds, *Strutture familiari, epidemie, e migrazione nell'Italia medievale* (Naples, Edizioni scientifiche italiane, 1984), pp. 117–34.
28. ASM, *Miscellanea storica*, 2, no. 420, 23 March 1479.

29. Ibid.

Postscript: The aforesaid Donato was considered in life, though scarcely living, having almost succumbed with the restlessness and disorientation fearing death, and with purplish and black measles throughout from toe to top [*a calce usque ad apicem*], and with a notable tubercle swelling, discoloured and corrupt, in the left axilla. Returning to him three hours after his death, I examined him again, finding the body much worse than before. The illness began, as was said, on last Saturday, sickening from choleric [fever], for he could have lied and claimed to have been [recently released from other fevers?] ... by the judgement of Catelano and Dyonisio.

30. The present case represents the common use of the term in the fifteenth century, to refer to 'pestilential pustules'; for a case resembling modern anthrax (Milan, 1492), see Gonario Deffenu, 'Storie cliniche del passato', *Castalia*, 11 (1955), p. 75–7.
31. Alfonso Corradi, *Annali delle epidemie occorse in Italia*, 5 vols (repr. Bologna, 1974), vols. 1, 4 and 5, *ad anumum*. And see Anna Maria Nada Patrone and Irma Naso, *Le epidemie del tardo medioevo nell'area pedemontana* (Turin, Centro studi piemontesi, 1978), p. 49, for brief discussion of 'mal di friole'. The chronicle of Tommasino Lancellotti of Modena, spanning the period from 1480 to 1530, shows that the name 'male mazucho' was in continuous use, that 1528 was an epidemic year of this disease, and that it had yet another popular name, 'el begon'. See Corradi, *Annali*, vol. 1, p. 394.
32. Corradi, *Annali*, vol. 1, pp. 319 ff.

L'anno 1477 ... la Peticchia penetrò in Italia, e penetrovvi quando i Turchi fecero sanguinosa irruzione nel Friuli, e della quale già abbiamo tenuto parola. Ma se dir non puossi donde e quando que' barbari pigliassero cotal morbo, ci conforta almeno, soggiunge l'Omodei, il pensare, che si può negativamente determinare l'epoca storica della petecchia presso altre nazioni, dal non incontrarsi in nessuna di queste verun documento che essa regnasse in un periodo antecedente a quello di cui si tratta.

Ficino's 'Consiglio contro la peste', written in the late 1470s, describes the petecchia, however as part of the special plague symptoms that year ['subita debilità di polso, gravamente di tutta la persona, massime di capo, farnetico, scorticamenti, arisioni, sete, macchie di sangue in vari luoghi, orina grossa et torbida ...' quoted in Corradi, *Annali*, vol. 1, pp. 320–21], as well as chroniclers [the anonymous of Parma, and Jacopo Melga of Brescia, who report the name of 'mal mazzucco']. Giuseppe Ferrario, *Statistica medico-economica di Milano*, 2 vols (Milan, 1840–50), vol. 2, p. 38, also summarizes the contemporary evidence: 'da alcuni registri dei morti in Milano rilevati che dall'anno 1477 al 1478 qui si ebbe una grande mortalità per *Febbre Petecchiale*. In molti certificati di morte trovansi le seguenti parole: *Obiit ex febre cum morbilis rubris, violatis, fuscis, morelis, etc.; cum pontilis nigris, etc.*'

33. In 1546: *De Contagione et Contagiosis Morbis et Eorum Curatione, Libri III*, trans. and ed. W. C. Wright (New York, Putnam's, 1930), 100–103.
34. See Katharine Park, 'The Life of the Corpse: Division and Dissection in Late Medieval Europe', *Journal of History of Medicine and Allied Sciences*, [hereafter *JHM*], 50 (1995), pp. 111–32; *idem*, 'The Criminal and the Sainly Body: Autopsy and Dissection in Renaissance Italy', *Renaissance Quarterly*, 47 (1994), pp. 1–33; L. R. Lind, 'Introduction', *Studies in Pre-Vesalian Anatomy* (Philadelphia, American Philosophical Society, 1975), pp. 3–19; and Jerome J. Bylebyl, 'Interpreting the Fasciculo Anatomy Scene', *JHM*, 45 (1990), pp. 285–316.
35. 2 June 1485: ASM, Fondo popolazione, reg. 77, at the date'.
36. Antonio dal Canton and Maria Castellano, 'Theory of Urine Formation and Uroscopic Diagnosis in the Medical School of Salerno', *Kidney International*, 34 (1988), pp. 273–7; Lorraine T. Baird, 'The Physician's "Urynals and Jurdones": Urine and Uroscopy in Medieval Medicine and Literature', *Fifteenth-Century Studies*, 2 (1979), pp. 1–8. In general see Siraisi, *Medieval and Early Renaissance Medicine*, p. 125.
37. If heated, urine containing protein will turn cloudy. See Meryl H. Haber, 'Pisse Prophecy: A Brief History of Urinalysis', *Clinics in Laboratory Medicine*, 8 (1988), p. 417. However, few of the accounts would lead one to the optimistic conclusion that the urine studied was 'fresh'. Thus cloudiness of the urine may well reflect bacterial growth.
38. ASM, Fondo popolazione, reg. 77, at the dates.
39. ASM, Fondo popolazione, reg. 76 and 77.
40. ASM, *Miscellanea storica*, 1, no. 613.
41. ASM, *Miscellanea storica*, 2, no. 521, Thomas Torniellis to the duke.
42. Beltrami, 'Il lazaretto di Milano', pp. 407–13; and Canetta, *Il lazaretto di Milano*, pp. 7–9. The latter includes few physicians on the committee, however; only Ambrogio Rosati, at that point head physician of the Ospedale Maggiore, was an official medical member. Elite, citizen representatives from each sector of the city consulted with unnamed physicians; Giovanni Giacomo da Vaprio, commissar of the *Sanità*, and deputies of the Ospedale Maggiore foundation were also members.
43. Guido Panseri, 'La nascita della polizia medica: l'organizzazione sanitaria nei vari stati italiani', in *Scienza e tecnica nella cultura e nella società dal Rinascimento a oggi*, Storia d'Italia, Annali, vol. 3 (Turin, 1980), 155–96.
44. Nicola Latroncino, 'La medicina e l'igiene nei libri e nei documenti del Magistrato di Sanità dello stato di Milano', *Atti e memorie dell'Accademia di Storia dell'Arte Sanitaria*, ser. 2, a. 4, n. 6 (1938), pp. 273–92; and Palmer, 'Physicians and the State in Post-Medieval Italy', in Andrew W. Russell, ed., *The Town and State Physician in Europe from the Middle Ages to the Enlightenment*, Wolfenbütteler Forschungen, vol. 17 (Wolfenbüttel, Herzog August Bibliothek, 1981), pp. 47–62.
45. Dante Zanetti, 'La morte a Milano nei secoli XVI–XVIII: appunti per una ricerca', *RSI*, 88 (1976), pp. 803–51.
46. Zanetti, 'La morte a Milano', pp. 819–20.
47. Palmer, in 'Physicians and the State', makes this point well.
48. Nancy G. Siraisi, 'Girolamo Cardano and the Art of Medical Narrative', *Journal of the History of Ideas*, 52 (1991), pp. 581–602, supplies an authoritative overview of the use of narrative in clinical texts of the late Middle Ages and Renaissance, illustrating the growing interest in

Hippocratic texts, typically for their narrative style, with a case study of Milan's Girolamo Cardano. I would only add that cause-of-death diagnoses were effectively a form of medical, clinical narrative outside the text tradition that Siraisi examines.